NATURAL AND CULTURAL RESOURCES MANAGEMENT PLAN

and environmental assessment

WALNUT CANYON

NATIONAL MONUMENT ● ARIZONA

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WALNUT CANYON NATIONAL MONUMENT

ARIZONA

Prepared by

Walnut Canyon National Monument
National Park Service
Department of the Interior

February 1976

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ABSTRACT

The natural and cultural resources management plan for Walnut Canyon National Monument, Arizona proposes a variety of actions designed to aid in perpetuating and interpreting the monument's natural and cultural resources for the enjoyment of present and future generations. Cultural resources proposals include archeological research, ruins stabilizations, and exterior restoration of the old headquarters cabin. Natural resource proposals include the collection of climatic and air quality data, research on and management of the area's vegetation, soils, and fauna, fire management studies, and development of a new fire management plan. Joint proposals incude research on past and current human impacts on the area, establishment of visitor carrying capacities, and boundary fencing and signing.

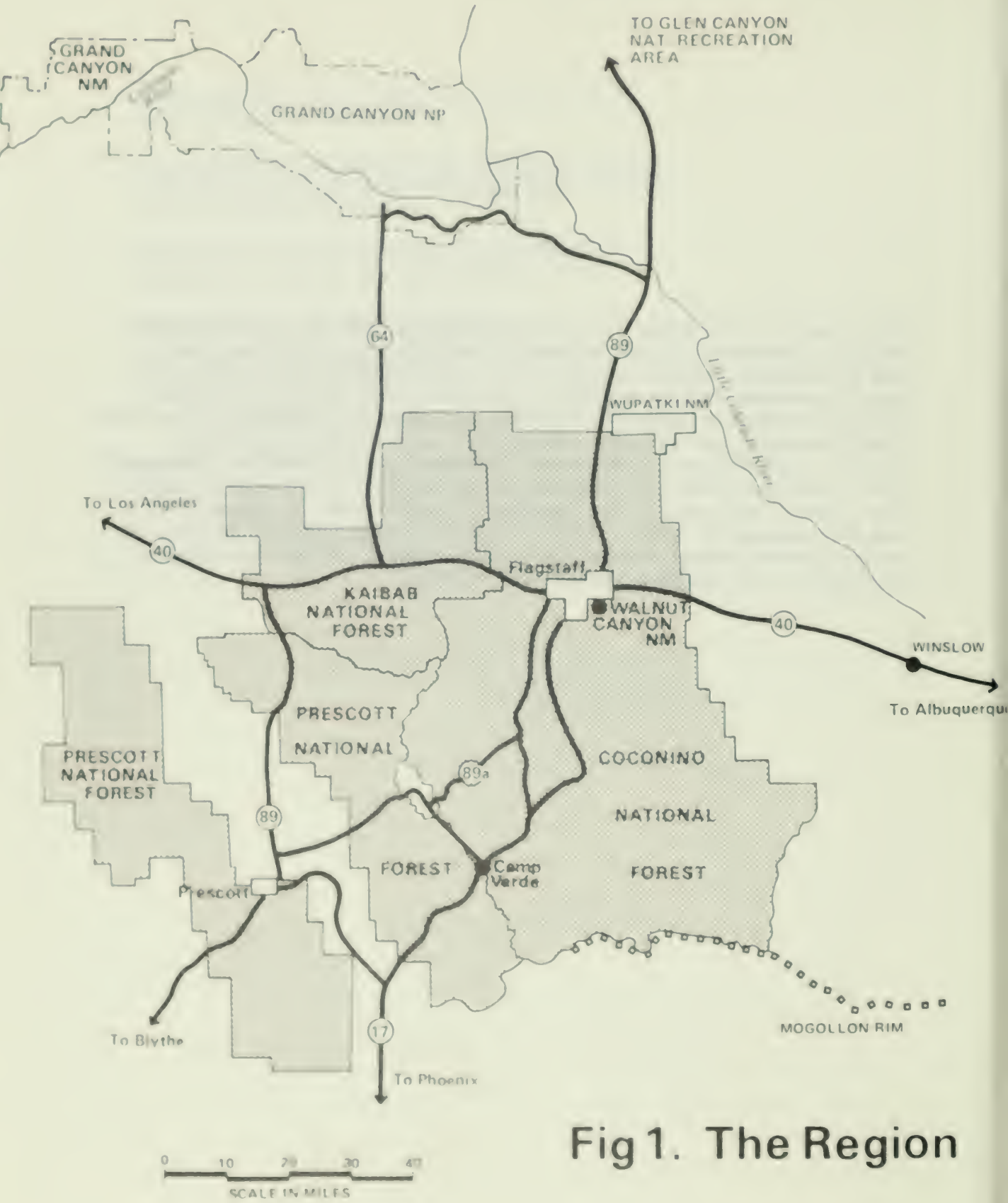

Fig 1. The Region

Introduction

This resources management plan presents a method for the Park Service to manage the cultural and natural resources of Walnut Canyon National Monument. The plan identifies resources management objectives and problems, and presents an action program to correct the problems.

Walnut Canyon National Monument, a 2,249-acre historical area in the National Park System, is located in Coconino County, Arizona, approximately seven miles southeast of Flagstaff (figure 1). The monument was established by Presidential Proclamation in 1915 to preserve and make available many prehistoric Indian sites of the Sinagua culture, which are located in the cliffs and on the rim of Walnut Canyon. Additional description of the monument's resources is included in the section "Description of the Environment," page 17.

MANAGEMENT OBJECTIVES

Resource management objectives have been developed in accordance with Administrative Policies for Natural and Historical Areas of the National Park System.

Continue such agreements as needed with the U.S. Forest Service for forest fire detection and control, and control of forest insects and diseases.

Restore natural plant cover as studies indicate.

Stabilize and maintain selected prehistoric Indian ruins.

Acquire private inholdings.

Fence the monument boundary.

Determine and enforce visitor carrying capacity.

Encourage further research on the archeological and biological resources that will aid in their preservation and interpretation.

The cultural portion of the resources management plan summarizes and evaluates the monument's cultural resources. Since these resources are fragile and non-renewable, their preservation under current laws, policies and standards of preservation is a primary objective of park management. The intent of the plan is to insure that the area is managed as a public preserve within which these resources are strictly protected and preserved. Preservation is prerequisite to use and use consistent with preservation is to be encouraged.

Basic goals to be met by the cultural resources projects are: to preserve intact the maximum possible amount of significant resources; to complete a cultural resources inventory, in compliance with Executive Order 11593; and to insure that resource studies are of fully professional quality, and preceded by a professionally adequate research design. Information obtained from the suggested studies will be used both to plan monument development in a manner compatible with preservation of the cultural resources, and to contribute to a basic theme of area interpretation--human adaptation to Walnut Canyon.

The prehistoric Sinagua people were a part of, and completely dependent upon, the area's natural environment. The natural resources portion of the resources management plan stresses the importance of giving emphasis to the study and management of these resources in order to understand and perpetuate the area's natural setting. Such study and management will aid the visitor in understanding the Sinagua occupation of the area and their impact upon it.

All proposals contained within this plan were guided by and concur with the above management objectives, the proclamation establishing the area, and accepted administrative policies for an historical area in the National Park System. The primary objective of the proposals is to insure the perpetuation of the monument's cultural and natural resources while simultaneously providing for visitor perception, appreciation, and enjoyment of these resources.

Cultural Resources Research and Management Actions

The cultural resources proposals contained in this plan are discussed under the following general headings:

Archeological survey. Archeological surveys within the monument have been more intensive than those in surrounding areas. The earlier surveys inside the canyon were often very superficial and data from these are less reliable than that from the rim surveys.

Past surveys of the monument have not provided a full inventory or base map of the monument's archeological resources. These surveys have not systematically covered some localities and survey records and maps are often inconsistent, unreliable and incomplete. Many previously recorded sites cannot be confidently relocated because of the difficulty of finding reference points in pinyon-juniper forests. Density and distribution patterns of sites beyond the monument's boundaries are not well known since past surveys of the area have been very limited and unsystematic. A stratified survey of this area is needed to obtain reliable information that will aid in interpreting the total canyon sustaining area.

In order to correct deficiencies and inconsistencies in past survey records and to acquire a reliable inventory of the area's archeological resources another survey of the monument and surrounding areas will be conducted. The first step in this proposal will be a comprehensive analysis of records from previous surveys to identify deficiencies. Subsequent to this the canyon's north rim will be resurveyed and a transect will be established beyond the rim to determine if field house density is uniform or if it diminishes away from the canyon. An expanded area along the canyon's south rim will be surveyed and a transect leading from this area to beyond the park boundary will be established. To investigate possible plant cover changes during and since the Elden phase (A.D. 1130-1200), pollen collections will be taken from terrace dams identified in this and previous surveys. Sites within the canyon will be reexamined to check earlier records and where possible provide additional information.

Surveys beyond the monument's boundaries are proposed to identify prehistoric farming areas and where wild foods were harvested. These surveys will also provide reliable information on the density and distribution of sites relative to the canyon rim environment.

Subsequent to the proposed surveys an archeological base map and report will be prepared. The report will deal with but not be limited to the following topics: seasonal changes in prehistoric settlement, field locations, check dam distribution and use, locations of clay deposits used by the area's inhabitants, the relationship between settlement and the sustaining area during the prehistoric occupation of Walnut Canyon, population estimates for all periods of the canyon's occupation, distribution and interpretation of petrographic art, and chronology of ledge ruins. If additional information is needed on the above or other topics appropriate research will be proposed in the report.

The primary aim of the surveys will be to gather data relevant to occupational patterns through time so that hypotheses concerning changing patterns of differential use of the environment can be tested. There is evidence for differential use of the north and south rims of the canyon in terms of the natural resources available. Survey work will concentrate on gathering data that will clarify this distribution.

Once the survey of the park and surrounding areas has been accomplished, a fully stratified universe in terms of phases and settlement patterns can be established. Questions about prehistoric land use can then be tested in a defined space and time framework, thus reducing costs by allowing proper sampling procedures.

Stabilization activities. Walnut Canyon contains approximately 300 to 400 individual cliff dwelling rooms. Masonry walls were built of unfaced, random limestone, one rock laid double in clay mortar and plastered with clay. Front walls are not bonded to partitioning walls and collapse easily. Destruction of the area's more accessible ruins has been due chiefly to vandalism, cattle, and weather.

The objectives of the on-going stabilization program, thus far, have been to maintain those sites along trails receiving heavy visitor traffic and to stabilize sites in view from either the visitor center or interpretive trails. Stabilization at the monument is slow, expensive and arduous because access to the ruins is difficult. The most convenient method thus far developed for transporting materials to the stabilization site is the use of an aerial tramway. This method leaves no irreversible scars on the landscape.

Future work will include the inspection of previously stabilized and unstabilized sites and the documentation of stabilization needs. Repairs, including such actions as resetting loose stones and grouting and mending cracks and separations in walls, will be performed as needed to maintain the ruins in good condition. Where possible, in those ruins where there is no visitation, stabilization repairs will be made with an adobe mortar to maintain an original texture and appearance.

In sites where visitation is heavy, repairs will be made with a tinted cement to achieve the strength necessary to withstand visitor impact.

Rodents, insects, and vegetation will be controlled where their presence presents the potential for damaging the ruins or other historic resources. Insect control measures to date have consisted of treating original and replacement wood in the ruins with a pesticide or preservative.

Restoration of the old headquarters and museum cabin. The old headquarters and museum cabin, which is listed on the National Register of Historic Places, is the monument's only known historic structure of significance (figure 2). Since construction, the cabin has received little attention or maintenance beyond reshingling the roof. The cabin is currently in poor condition and in need of exterior restoration to insure its preservation.

In order to prevent the cabin's continued deterioration and the possible loss of this historical resource, the cabin's exterior will be restored. Prior to the initiation of restoration work an historic structures report will be prepared. All restoration work will conform to the specifications and guidelines presented in the report.

The effects of restoration on the cultural deposits surrounding the structure will be evaluated in the report. If excavation of this fill is necessary it will be conducted to a professionally adequate research design.

Natural Resources Research and Management Actions

A major objective of the natural resources proposals in this plan is to provide the basic data and direction, previously lacking, to enable efficient management and interpretation of the area's natural resources. The information obtained will interrelate closely with that acquired from the proposed cultural resources studies and aid in the preservation and proper management of both natural and cultural resources.

The natural resources proposals within the plan are discussed under the general headings below.

Monitoring climatological and air quality data. Since 1966, precipitation and maximum, minimum, and at-observation temperatures have been

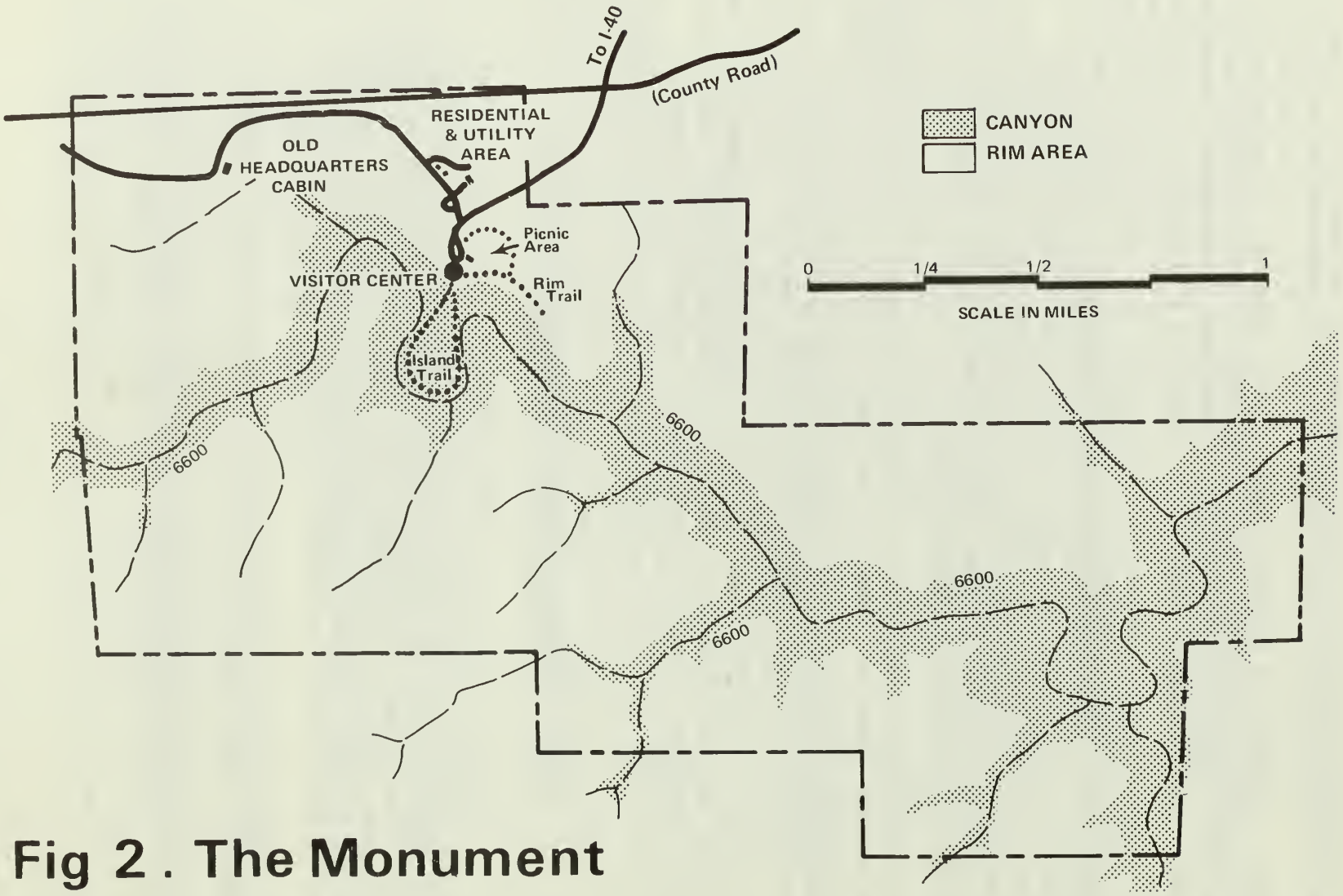

Fig 2 . The Monument

recorded daily at the monument's weather station. More complete climatological information is needed to properly assess resource status and trends and to adequately evaluate relationships between these resources and climate parameters.

Additional weather instruments will be acquired to obtain relative humidity, wind speed and direction, and fuel stick moisture data. As in the past, all instruments will be read daily.

Air quality monitoring will be initiated to gather baseline air quality data and insure that management is aware of any changes in air quality.

Preparation of photomosaic of monument. A few old aerial photographs, covering portions of the monument, are available. A new and complete set of aerial photos of the monument is needed to compile vegetation and soils maps of the area. The photos would also prove useful in the archeological surveys proposed within the cultural portion of this plan.

Aerial photographs will be taken of the entire monument. The photos will be suitable for stereo use, in color, and of an appropriate scale. An orthophoto map, a photomosaic photo adjusted for true scale during printing,will be prepared for the monument.

To obtain additional information on the area's vertebrate fauna, a number of studies will be conducted. These studies will begin with general surveys to assure that all vertebrates occurring within the monument are identified. Special attention will be given to the identification of exotic, rare or endangered species and problem areas requiring research or other action. The studies will include the collection, where possible, of population data and compilation of distribution maps for those species identified as endangered, threatened, or of questionable status or other significance. Whenever feasible, information on seasonal abundance and habitat restrictions will be noted. Such topics as external influences on the monument's wildlife and relationships between local water supplies and resident wildlife will be investigated.

Animal ecology. Studies of the monument's vertebrates have been limited and have provided management with relatively little information on those vertebrates within the area. While current checklists of the mammals and birds have been prepared, the area's reptile list is incomplete. No list of amphibians has been prepared. Inadequate and often unreliable records of sightings have been kept since 1936.

Efforts will be made to maintain healthy populations of all species indigenous to the monument. Research proposals and other management actions will be developed and implemented as problems are identified.

Such proposals and actions may include life history, physiology, carrying capacity, and predator-prey studies, habitat modification or stabilization and population control or protection measures.

Identification and monitoring of insects and disease organisms. The monument's insects and disease organisms have been only partially inventoried and studied. Current gaps in our knowledge of these resources preclude their proper interpretation and establishment of an effective management program.

To provide management with more complete and accurate information on these resources a variety of actions is proposed. The identification of all specimens in the monument's current, unauthenticated and incomplete insect collection will be checked. New specimens will be added to the collection and efforts will be made to identify the majority of the area's insect species. Special attention will be given to the identification of those species which adversely affect the area's trees. Problem areas requiring further research will be identified and appropriate studies will be proposed.

Forest disease organisms present in the area will be identified, along with the magnitude of their infection. Recommendations for the management of both forest insect pests and diseases will be sought. Where appropriate, monitoring programs will be initiated.

Vegetation and soils research. Management and interpretation of the area's vegetation and soils have been hampered by a lack of information on these resources. To date only a plant species list and a nearly complete herbarium have been prepared for the monument. In order to gather basic information essential for the efficient management of these resources a number of studies will be conducted. When aerial photographs of the area are available vegetative units will be delineated on the photographs. Ground surveys will determine composition, density and homogeneity of the units. Successional relationships between units will be determined and an effort will be made to determine the area's vegetative cover during the Sinagua period. Recommendations on the feasibility of restoring the vegetative cover to that of the Sinagua period will be sought.

Any unique or theatened plant communities and species will be identified. Problem areas requiring further research or management will be identified and actions will be proposed. A complete vegetation map of the monument will be prepared.

An accompanying soil survey will utilize ground survey and aerial photographs to identify soil series and types and provide for each series a profile description and information on its distribution. Information obtained from the above survey will be used to compile a soils map of the monument. The physical and chemical

properties of each soil and its suitability for various engineering and recreational uses will be investigated and a report will be prepared.

Fire management. Human-caused and naturally occurring forest fires have been aggressively suppressed within the monument since its establishment in 1915. While the fire history and ecological role of fire in the area are not well known, suppression activities appear to have interrupted and influenced the natural role of fire in forest succession and the ecology of the area. Suppression efforts have apparently led to the unnatural accumulation of forest litter.

In order to determine the need for, and feasibility of, reestablishing fire to the area, the monument will conduct fire history and ecological studies. As part of these studies fire history data will be collected from Forest Service records for adjacent areas. Past fires within the monument will be dated from fire-scarred trees. Heavy and unnatural concentrations of litter within the monument will be mapped. The use of natural fires, prescribed burns and manual treatments as means for reducing fuel levels and restoring the ecosystem to pristine conditions will be considered. Small experimental test plots may be prescribed burned as part of the studies.

Upon completion of these studies and after consultation with the Forest Service a new fire management plan will be drafted for the area. This plan will follow the basic guidelines presented in "Fire Management in the Western Region," a plan prepared by the National Park Service. Until the new fire plan is completed the monument will continue to suppress all fires in the area.

Other Resources Research and Management Actions

The proposals within this section are discussed here because of their importance to the proper management of both cultural and natural resources and the inappropriateness of discussing them under separate natural and cultural resource sections.

Human impact on the ecosystem. Human impacts on the area during the historic period have been recorded in various ways and locations throughout the years. The monument maintains a fact file in which this information is accumulated. No ethno-biological studies have been undertaken at Walnut Canyon National Monument. The Sinaguan impact on the area is subject to speculation. Historic human use, including domestic livestock which heavily grazed in the area in the early 1900s, in altering natural processes in the area is not well known. To obtain information on the impacts of Sinaguan and post-Sinaguan occupation of the area a number of studies will be conducted. Ethno-biological studies will be undertaken to aid in determining the impacts of the Sinagua on the environment during their occupation. These studies will be closely tied to the

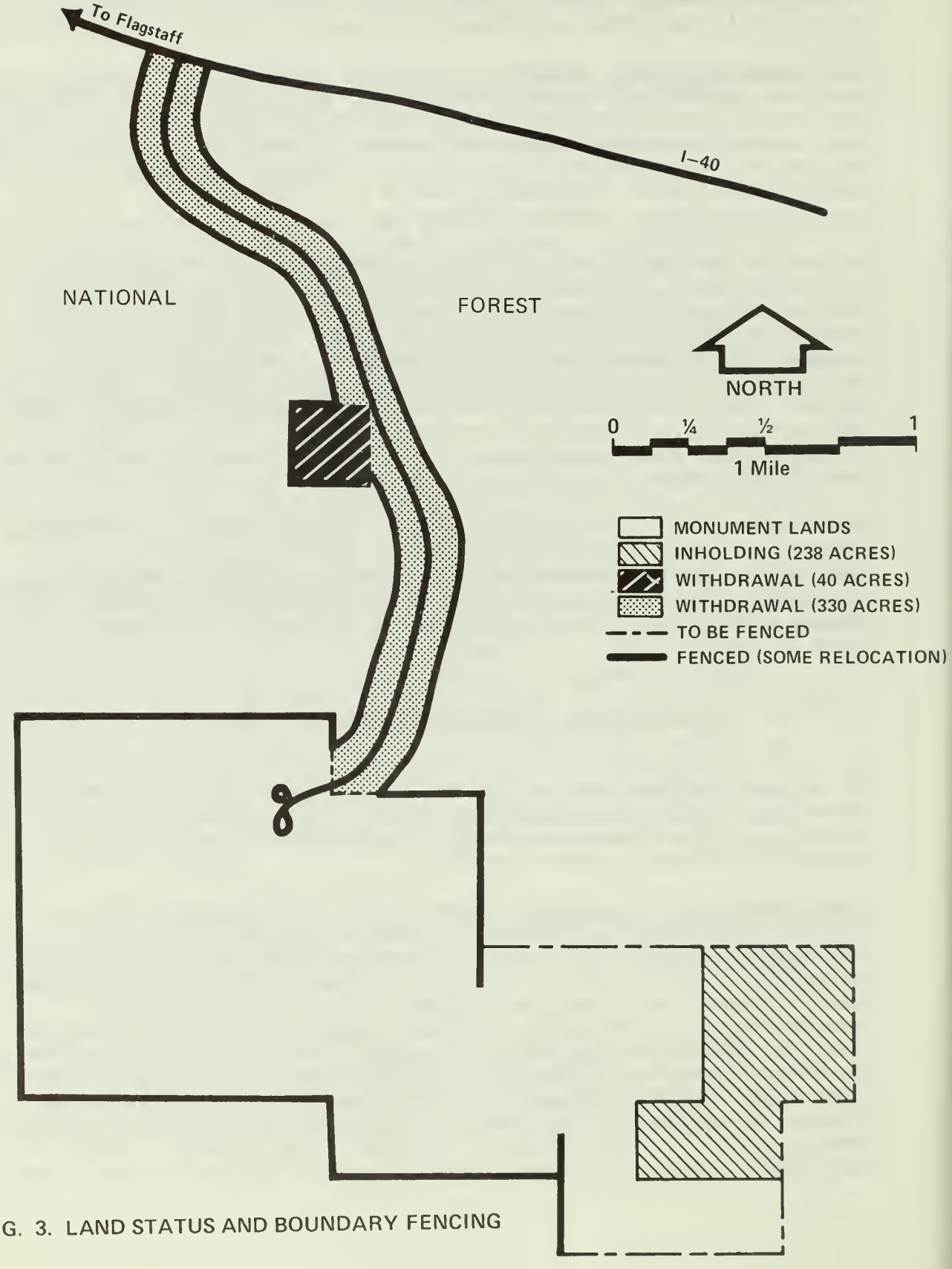

FIG. 3. LAND STATUS AND BOUNDARY FENCING

other biotic resource studies proposed in this plan. Library research and personal interviews with older residents of the area will be used to obtain information on historic uses of the area and associated impacts. The information obtained in these studies will be analyzed in conjunction with that provided by the studies proposed in the plan's cultural section.

Visitor use and carrying capacity. Presently there are only four areas within the monument open to visitors: the visitor center, the Rim Trail, the Island Trail, and the picnic area. The capacity of each area to withstand visitor use has not been determined, nor has the capacity for visitor use (if it exists) been determined for unopened areas such as the canyon bottom, the old headquarters cabin, and potential interpretive trail sites. If present open areas become overused, the visitor carrying capacity of other areas should be known before they are opened to the public.

Interdisciplinary studies will be conducted to determine maximum allowable levels for currently used areas and potential visitor use levels for closed areas with high interpretive values. As part of these studies visitor use may be rotated between open areas to provide baseline data for establishing impacts of light and heavy use. The effects of various management techniques such as paving and fencing in influencing allowable use will be evaluated. The feasibility of allowing recreational uses not currently available in the monument will be investigated.

When carrying capacities are established for the various areas and activities within the monument, use will be held to that level. As additional information becomes available carrying capacity figures will be readjusted as necessary.

Boundary signing and fencing. Half of the monument's northern boundary, all of the eastern boundary, and half of the southern boundary are currently unfenced (figure 3). Boundary signing and fencing are necessary to prevent trespass grazing, logging, sport hunting, and pot hunting in the area. In order to clearly define the monument's boundaries and allow for the proper placement of fences and signs, the entire monument was surveyed and twenty-three permanent monuments were set by the Bureau of Land Management during the summer of 1974. Currently unfenced sections of the monument's boundary will be fenced and approximately eight miles of old fences will be relocated to the boundary (figure 3). In addition, a recent finding of fact has indicated that Public Land Order 1269 provides a withdrawal order for the monument entrance road, a 1000 - foot wide, 3 - mile - long corridor through national forest lands. As a result of the BLM survey, approximately 6 miles of fencing is required to redefine the corridor. All fences will be constructed according to BLM standards.

Interrelationships with Other Projects

Fire management. The proposed fire ecology study and resultant management recommendations will be developed consistently with the plan and environmental statement, "Fire Management in the Western Region," which is currently under review.

Land acquisition. The monument contains an inholding of 238 acres, owned by the Atchison, Topeka and Santa Fe Railway Company (figure 3). The inholding includes land on both sides of the canyon as well as the canyon bottom and contains several ancient cliff dwellings. Acquisition of this land is considered necessary to insure the preservation of the area's cultural and natural resources. Acquisition would rule out the possibility of future commercial and/or private development of the area.

Since 1955 or earlier, efforts have been made to acquire this inholding, either by purchase or land exchange. The monument will continue acquisition negotiations with the Atchison, Topeka and Santa Fe Railway Company and acquire the inholding as soon as possible.

ENVIRONMENTAL REVIEW

The resources management plan for Walnut Canyon National Monument presents a long-term action program for managing the area's resources. Its accompanying environmental assessment analyzes and documents the environmental impacts of the proposed actions.

The proposed archeological research will aid in the acquisition of a reliable inventory of the area's archeological resources. The ruins stabilization program will identify stabilization needs and insure the preservation of the area's ruins. In some cases stabilization may replace or mask orginal materials and alter cultural deposits. Restoration of the old headquarters cabin's exterior will insure its continued preservation. The various natural resource and joint studies proposed will provide the kind of information necessary for the efficient management of the area's resources. Establishment of visitor carrying capacities will aid in insuring the area's preservation. The proposed boundary fencing and signing will aid in protecting the area's resources.

The alternative of no action was considered for each proposal. For the proposed archeological and natural resources research, more restricted studies were also considered. An alternative to restoration of the old headquarters cabin's exterior is the reconstruction and restoration of the cabin's exterior and interior.

Because none of the proposed actions entail significant environmental impacts, it is recommended that the natural and cultural resources management plan be assigned a negative declaration. Unless significant controversy develops during public review, a full environmental statement will not be prepared.

The resources management planning effort at Walnut Canyon will be translated into an action program when the 30-day public review period has expired.

ENVIRONMENTAL ASSESSMENT

The environmental assessment for the resources management plan consists of the preceding description of the plan and the following sections.

Description of the Environment

Walnut Canyon National Monument, located in northern Arizona approximately seven miles southeast of Flagstaff, consists of 2,249 acres in Coconino County (figure 1). Elevations within the monument range from 6,270 feet to 6,830 feet. The monument is classified and managed as an historical area within the National Park System. The monument, established by Presidential Proclamation in 1915, preserves and makes available to the public many prehistoric Indian sites of the Sinagua culture, which are located along the cliffs and rim of Walnut Canyon. The preservation and interpretation of these archeological resources is the monument's primary purpose.

NATURAL ENVIRONMENT

Climate. The monument's climate is generally moderate. Average daily temperature extremes vary from 86°F and 52°F in summer to 44°F and 17°F in the winter. Temperature extremes recorded in the monument include 99°F in June 1970 and -20°F in January 1963. Average annual precipitation is eighteen inches. The two wettest months, July and August, during which thundershowers account for approximately two-thirds of the area's annual precipitation, are preceded by the year's two driest months. The remainder of the area's annual precipitation is received during winter snowfalls. Average annual snowfall is fifty-eight inches.

Prevailing winds are from the west in summer and southwest in winter. High winds are most frequent in the spring and early summer. No data on wind velocity or relative humidity is available.

Geology. Walnut Canyon National Monument is located on the Coconino Plateau which is that portion of the vast Colorado Plateau that lies north of the Mogollon Rim and south of the Grand Canyon, in northern Arizona. A sea bed in Permian times--over 200 million years ago--the plateau is today composed mainly of sedimentary material, with Kaibab limestone forming the cap rock over most of the plateau. Through this plateau are carved many drainages. Small, usually dry seasonal streams are the norm, but some major water

courses cut the plateau. Some streams, like Oak and Sycamore Creeks flow south and cut the sharp escarpment of the Mogollon Rim with beautiful canyons, exposing varied layers of sedimentary deposits. Other streams flow on the flat plateau itself, acting as feeders to the Little Colorado River which bisects the Coconino Plateau southeast to northwest, and joins the Colorado River. Walnut Creek is such a feeder stream to the Colorado River through the Little Colorado River. The south-central section of the Coconino Plateau contains the extensive San Francisco volcanic field, capped by a large crater, which forms the San Francisco Peaks. Among them, Humphrey's Peak, at 12,670 feet, is the highest point in Arizona.

Walnut Canyon, the monument's major geologic feature, bisects the monument from east to west and is 400 feet deep and one-fourth mile wide. The canyon exposes two major geologic formations, the Kaibab limestone and Coconino sandstone. The lower formation is the cross-bedded sandstone formed as dunes of aeolian deposition at the edge of the Kaibab Sea. The upper formation is limestone deposited during a late expansion of the same sea. It contains many fossil remains of freshwater molluscs. This formation averages 250 feet in depth within the monument and forms the cap rock.

Soils. Little is known about the soils of the monument. Basically three types of soils have been described: a thin layer of humus on shallow "A" horizon over Kaibab limestone; light colored, shallow loamy and calcareous soils on Kaibab limestone; and shallow soils on southern exposures of the canyon walls.

Hydrology. Walnut Creek flowed through the canyon until 1904, when two dams were built upstream from the monument to collect and furnish water for the city of Flagstaff. The dams form Upper and Lower Lake Mary. Today the canyon is dry except for what water may collect in small pools from spring runoff and during periods of particularly hard rains. Since the dams were built water has flowed through the canyon five times as a result of very heavy spring runoff. The last recorded flow was in 1973, lasted for a little over three weeks, and had an estimated flow of 750 to 850 cubic feet per second. There are no surface water gauging stations within the monument, and in view of the above, none have been recommended.

The groundwater table within the monument slopes from the southwest to the northeast. No appreciable changes are anticipated in regards to aquifer yield within the forseeable future due to the land status of the area upgradient from the monument (Forest Service land). Thus no well monitoring or other groundwater studies are

indicated. The monument's present water supply is furnished by a drilled well located in the monument. This well was completed in August 1970, to a depth of 2,007 feet. The static water level was 1,536 feet below land surface datum. The well produces from the Coconino/Supai sandstone aquifer and is reported to have a useful capacity of at least twenty-five gallons per minute.

Flora. The entire monument, except for the sheer canyon walls, is rather densely vegetated. Most of the monument is covered by evergreen forest. Interspersed through the forested areas are small areas of grass and brush. Three life zones, the Canadian, Transitional and Upper Sonoran, are represented in the monument. Principal tree species within the monument include ponderosa pine, pinyon pine, juniper, oak, and on the north-facing slopes Douglas-fir. On the north rim of the canyon, where the visitor center is located, pinyon pine and juniper are most abundant. Ponderosa pine covers most of the canyon's south rim. The canyon's south-facing slopes contain a selection of typically lower elevation plants. Several varieties of cacti, broad-leaved yucca, saltbush, wolfberry and other species adapted to warmer, drier conditions are abundant on these slopes. Because of the shade and coolness on the canyon's north-facing slopes many higher elevation plants, such as Douglas-fir and Gambel's oak, are represented here. There is still enough seepage and runoff along the floor of the canyon to permit riparian vegetation in this area. Species within this area include the native black walnut, wild grape, narrow-leaved cottonwood, creek dogwood, aspen, box elder and wild rose.

Trees in several areas of the monument have been subject to attacks by bark beetles and other insects. Many of the junipers and some other trees are infected with mistletoe.

Fauna. Mammals commonly found in the monument and vicinity include mule deer, fox, coyote, skunks, rabbits, and a variety of rodents. Elk, mountain lion, black bear and badger occur infrequently. A study, conducted in the monument to determine habitat preferences of the area's birds, was conducted in the late 1960s. This study noted 101 species, representing twenty-nine families and nine orders, in or near the canyon. The monument's bird and mammal collections have very few specimens, the majority of which were collected and prepared after a natural death. The area's reptiles and amphibians have been only partially inventoried. Locally rare wildlife and species of particular concern within or adjacent to the canyon include coatimundi, northern black bear, ferruginous hawk, osprey, and peregrine falcon.

Because of the monument's size, 2,249 acres, many of the larger and more mobile wildlife species are greatly influenced and affected by the management practices of the monument's neighbors. The most direct influence is hunting, which is allowed all around the monument. The effects of adjacent hunting on the monument's deer, elk, turkey,

dove, rabbit, tassel-eared squirrel, and predators such as mountain lion, bobcat, fox and coyote are not known. Wild domestic dogs occasionally run through the monument in small packs, and their effects are also unknown.

CULTURAL ENVIRONMENT

Archeological resources. The known history of human occupation of the park begins in the Cinder Park phase (A.D. 500 to 700) with a trace occupation on the south rim. The Cinder Park phase was defined from the excavation of pithouses at Cinder Flat, about eight miles north of the monument. It is poorly known archeologically, but seems to be an early dry-farming and foraging adaptation to the ponderosa pine and fir zone surrounding the San Francisco Peaks. Local occupations appear as small, shallow pithouse villages and are distributed next to the better farm lands. The Sunset phase (A.D. 700 to 900) is not represented on the south rim, but there is a tract occupation on the north rim. It is similar to the preceding phase, but with some population expansion; pithouse villages still are common. The Rio de Flag phase (A.D. 900 to 1100) is represented by a trace pithouse occupation on the south rim and by the beginnings of intensive north rim occupation. Culturally associated field houses may have appeared outside the park boundaries at this time. The Angell-Winona phase (A.D. 1066 to 1100) is not represented on the south rim, but is present on the north rim. The Padre phase (A.D. 1100 to 1130) is the beginning of intensive occupation of deep masonry pithouses on the south rim and the continuation of occupation on the north rim. The Elden phase (A.D. 1130 to 1200), with its multi-room masonry pueblos, is the period of peak population and optimum land use on both rims. There is some evidence for a tapering off of occupation at the end of the Elden phase, with the final abandonment of the canyon in the Turkey Hill phase (A.D. 1200 to 1300). There are no remains of the succeeding Clear Creek phase (A.D. 1300 to 1400) in the canyon, which apparently was abandoned earlier than other areas of Sinagua occupation.

A word of caution about Sinagua chronology: dating the phases in the Walnut Canyon area presents an extremely confusing situation. Various researchers view the problem in different ways, therefore, a number of different chronologies exist. More work in the area is needed before a firm dating sequence can be established (the above dates were supplied by Pete Pilles, Museum of Nothern Arizona, and are based on current information).

Prior to the Angell-Winona phase, sites were primarily located along the parklands of the San Francisco Peaks and the larger drainages of the peaks (i.e., Rio de Flag, Bonito Park, Cinder Park, and Medicine Valley). About 1065, Sunset Crater's formation resulted in the deposit of a layer of black ash about thirty miles in diameter over the Sinagua area; Walnut Canyon was in the southwest

corner of the ash deposition. This layer of black ash increased the water retention ability of the land, since it provided a vapor barrier mulch and reduced evaporation. This opened up large areas of previously non-farmable land. The spatial expansion of prehistoric populations in the Padre and Elden phases may have been partially attributable to this increased arable land area. There is evidence that the use of this land was by very small social units characterized by single-room field houses in most of the black ash area; thus the population appears to have spread out into nuclear units to exploit new farm land. In the Elden phase, sites are located in many areas not used earlier, and there seems to be a seasonal dispersion and concentration pattern in pueblos as if the use of the black ash area was oriented towards extensive agriculture (farming large areas with less labor) rather than intensive agriculture (farming smaller areas with more labor input) with populations spread over the black ash area. Later, the Sinagua may have shifted to an infield-outfield system where more permanent intensively activated gardens were maintained close to the home village, and extensive outfields were farmed from temporary field structures.

Both rims of the canyon were used prehistorically for farming but the number of sites on the north rim (104) is significantly greater than the number on the south rim (38) in an equivalent area. It would appear that the south rim's slight difference in elevation and correspondingly earlier frost date limited its farming potential. There is accumulating evidence for a complex of check dams and terracing in the minor drainages on the rim, to build up soil thicknesses and increase subsurface moisture. Surveys have been restricted to the park boundaries, so there is no estimation of the sustaining area for the canyon (area of land supporting the prehistoric Walnut Canyon population).

Archeological research in the monument. The monument has been explored periodically for the past ninety years. In 1883, James Stevenson explored ruins in the Southwest and visited Walnut Canyon, excavating some cliff houses in the canyon for museum collections and primary exploration. In 1885, Stevenson and J.W. Powell surveyed the ruins of the Flagstaff area, including the cliff dwellings of Walnut Canyon.

Harold S. Colton began a survey in 1916 that lasted until 1930. His purpose was to collect data for reconstruction of culture histories and prehistoric culture areas. In 1921 he surveyed Walnut Canyon and recorded 120 sites in the "forts" area, as part of an overall survey of the area between Flagstaff and Turkey Tanks. Ruins were recorded on both sides of the canyon, but emphasis was on large and obvious canyon sites located at each cluster of cliff dwellings around the "forts." Colton assigned sixty numbers to "cliff shelters," three numbers to "forts," and twenty-two numbers

to "open sites" he located while climbing in and out of the canyon.

In 1932 Hargrave excavated and stabilized two rooms in a nine-room cliff complex at Walnut Canyon. Information on the excavations at Walnut Canyon are scanty, but the excavation appears to have been salvaged as part of a park development program in which sites were stabilized along the trail areas. There is no data on excavation technique or sampling procedures.

Paul Beubien and Paul Ezell excavated nine rooms at Walnut Canyon in 1940, using C.C.C. enrollees, as part of a ruin-trail stabilization program. They recovered domestic artifacts and ceramics which were used to date the site at A.D. 1067-1200. This confirmed the relatively short-term occupation of the canyon by the "cliff dwellers." From 1940 to 1948, Paul Ezell stabilized seven of these sites.

Sallie Van Valkenburgh surveyed in four sections of the north rim during 1955, 1957, and 1958 for the purpose of locating pre-Elden phase sites, burial areas and farm and garden plots. She located check dams in the canyon side drainages, and concluded that habitation sites were primarily boulder shelters used as temporary field houses. The soils on the rim were discovered to be very thin, although local gardens of squash and corn grow very well on them. Van Valkenburgh's survey lasted for about four weeks during the winter, averaging about seventeen acres a day in partially snow-covered pinyon-juniper forest. The headquarters area was intensively surveyed, and the rest of the forest was walked and numbers assigned to various sites. NA 5889, a small mounded boulder site, was later trenched and was interpreted as a temporary field shelter. From this survey seventy-eight new sites were recorded, for a total of 104 sites in three-fourths of a section, inside the monument.

In the two reports of Van Valkenburgh's work no dates are given to specific sites; occupations are assigned to either a pre-eruptive period or a post-eruptive period. From the sherd tables of the manuscript, the only pre-eruptive sites appear to be three sherd scatters that were possibly pithouse sites.

In 1960, Stuart H. Maule excavated a "spaced stone outline" in Walnut Canyon and found it to be a natural outcropping used for a very short period as a campsite. Reported in a letter to the Superintendent of Walnut Canyon, this type of site resembles those found by Van Valkenburgh on the north rim.

Robert A. Schley explored Paho Cave in 1961 and found fourteen prayer sticks. In that same year, Robert S. Euler, then of Arizona State College, surveyed the south rim including all side-drainages except for Wild Cherry Canyon. Twenty-seven person-days were spent

in survey, recording thirty-eight sites in about one and one-half sections. The crew of four students walked a grid pattern and Euler recorded the sites. Sherd areas and pithouses may well have been overlooked due to dense pine-needle cover.

Euler's survey showed that the primary occupation of the south rim occurred during the Elden phase with only limited occupation before or after. As in the case with the north rim, most sites were boulder outlines interpreted as temporary field structures.

In 1964, John C. Cramer surveyed the terrace and check dam system in a small canyon complex on the north rim of Walnut Canyon. He found twenty-eight "ravine terraces" occurring in groups up to twelve in number in single small drainages. Several terraces were associated with "field houses" located on a ridge between drainages. One locality was dated between A.D. 1100 and 1200.

Norman Ritchie excavated several structures on the north rim near the headquarters in 1966, assisted by a field methods class. An Elden phase, two-room masonry house and two Padre phase, deep masonry pithouses were excavated for interpretive exhibits. Rooms were excavated as single units, trash mounds were removed in grids where burials were found and irregular trenches extended beyond the grid system in search of other burials. Possibly fifteen to twenty percent of the extramural portion of the site was tested. His report presents artifacts in a conventional typology and provides ceramic dates.

History. Portions of what is now the monument received government protection as early as August 1896, when the 795,360-acre San Francisco Forest Reserve was established. The reserve included a checkerboard pattern of even-numbered sections of land over a major portion of the area north of the Mogollon Rim and south of the Grand Canyon, in the area of the San Francisco Peaks. The unclaimed sections were left open for homesteading. During this period, portions of the present monument were heavily grazed by both sheep and cattle.

In April 1902, the remaining odd-numbered sections of land not under private ownership were added to the original reserve and the resulting acreage of government administered land was renamed the Coconino National Forest, by which name it is known today. The original checkerboard land pattern is evident on current maps of the national forest indicating the numerous homestead "inholdings."

With the formation of the Coconino National Forest, the cliff dwellings of Walnut Canyon became an important area of visitation. Permanent personnel were stationed here to watch over the ruins,

but there was no real development of the area as an archeological site or as a recreation area. President Woodrow Wilson signed the proclamation making Walnut Canyon a national monument on November 30, 1915, but the Forest Service continued administering the area until 1934 when the land was transferred to the Park Service. In September 1938, the monument was extended to the size of 1,879 acres. In addition, P.L.O. 1269, February 28, 1956, provides a 370-acre withdrawal parcel.

The earliest historical description of Walnut Canyon is by James Stevenson, who in 1883 explored and tested the ancient cliff dwellings of the canyon. From 1883 until 1915, when the canyon received legal protection, pot hunters almost completely destroyed the cliff structures.

National register status. The entire monument is on the National Register of Historic Places. As a property on the national register, all proposed federal actions within the area require compliance with Section 106 of the National Historic Preservation Act of 1966, Public Law 89-665.

The only known historic structure of significance in the monument is the old headquarters and museum cabin which has been placed on the national register.

Visitor use and development. With construction of a paved approach road in 1956, monument visitation increased rapidly. Total visitation exceeded 80,000 in 1965 and 1966. During construction of U.S. Interstate 40, poor signing and detours at the Walnut Canyon exit appeared to affect travel. For the past five years total annual visitation has been around 70,000. With the completion of Interstate 40 and the exit, some increase in visitation is expected.

The average size of groups, other than families, visiting the monument is thirty. Most organized tour groups visit the area during the peak summer travel months. A number of school groups visit the area throughout the year. Peak visitor use occurs during July and August.

About eighty percent of the visitors take the Island Trail and spend ninety to 100 minutes in the area. Approximately thirteen percent of the visitors hike the Rim Trail (figure 2).

There is a small family-type picnic area in the monument. It is designed and equipped for cold lunches. This is generally for visitors passing through and not for encouraging visits for the primary purpose of picnicking. Gas stoves are permitted if visitors desire to use them in preparing a hot lunch. The picnic area has fifteen sites with a maximum carrying capacity of approximately seventy-five people.

On-site developments include the entrance road, visitor center and parking lot, picnic area, Rim and Island Trails, maintenance area, sewage lagoon, water tower, and residences.

LOCAL AND REGIONAL ENVIRONMENT

The monument is surrounded by Coconino National Forest, and is thus affected and influenced by the Forest Service's multiple use policies and practices. Uses permitted on adjacent lands but not in the monument include hunting, grazing, logging, wood gathering, camping and the use of motor vehicles off paved roads.

Walnut Canyon National Monument is bounded partially on the west and north by the Flagstaff city limits. The population of Flagstaff in 1970 was approximately 27,000. A projected population estimate for the year 2000 is 65,000. The current racial composition of the population is approximately eighty-eight percent Caucasian, of which eighteen percent are of Spanish decent, five percent Native American, five percent Black, and two percent Asian.

Flagstaff, which contains Northern Arizona University, contains educational facilities extending from the elementary through post-graduate levels. There are more than forty churches and many service and fraternal clubs. Two museums, one run by an historical society and the other privately operated for scientific research, are located in or near Flagstaff.

Coconino County, of which Flagstaff is the county seat, contains 18,599,000 acres and is the second largest county in the United States. Over half of its total population of approximately 49,000 reside in Flagstaff. Outside the county seat the population is predominately Native American, since portions of the Navajo and Hopi Reservations are in the county. The county's population is expected to increase in the future, although the area's historic problem of insufficient water supplies may well have a retarding influence.

Economically the city of Flagstaff is still considered dependent on the timber industry. Other economic elements of less importance are ranching and small industry. Tourism represents a rapidly expanding industry with great potential.

Future development of Flagstaff will probably occur first in the Continental Country Club area, to the west of the monument. Other areas of growth will be to the north, northeast, and west of Flagstaff. Areas of growth are limited due to land ownership patterns; ninety-five percent of the county is federally owned. Forest Service managers maintain they will not be trading more land located between Walnut Canyon and developed portions of the city. The state's plans for its landholdings near the monument are unknown.

The northern plateau around Flagstaff has many prehistoric sites,

many of which have not been inventoried by land owners. Coconino County contains five properties on the National Register of Historic Places, including Winona Archeological Site, C. Hart Merriam Base Camp, Lowell Observatory, Wupatki National Monument, and Walnut Canyon National Monument. As the federal and state agencies controlling land in the area begin to comply with Executive Order 11593, a substantial increase in nominations to the national register is expected.

Two governmental cooperative groups have been formed within the region: the Northern Arizona Council of Governments and the Coconino/Yavapai County Resource Conservation and Development Project. The latter published a report in February 1973, under Public Law 87-703 (Food and Agriculture Act of 1962). The report evaluated the area's problems and needs and proposed actions for the conservation and development of the natural and human resources in the two counties.

PROBABLE FUTURE ENVIRONMENT WITHOUT THE PROPOSAL

Without the proposed archeological research, future efforts to properly manage and interpret the area's archeological resources will suffer from lack of information. Available information on the area's archeological resources will remain fragmentary and in some instances of questionable accuracy.

If the proposed ruins stabilization and old headquarters restoration proposals are not implemented, these cultural resources will continue to deteriorate and may in time be lost.

If the various natural resource studies and the climatological data and aerial photographs are not implemented, the area will continue to lack the kind of information necessary for the efficient management of the area's natural resources. Problem areas may continue to develop and intensify while no action will be taken to identify or correct the situation.

Without the proposed fire management actions the monument will continue indefinitely its current policy of aggressive suppression of all fires. Such action will perpetuate and possibly intensify any unnatural conditions caused by this policy in the past.

If the proposed visitor use studies are not conducted areas of the monument currently closed to visitors will remain closed. If visitor carrying capacities are not established and enforced,the monument's resources will, at some time in the future, suffer from excessive use.

If the boundary fencing proposal is not implemented the area's boundaries will not be accurately marked. Trespass logging, hunting, and grazing may occur.

Environmental Impact of the Proposed Action

The intended impact of the cultural portion of the plan is to minimize losses to and provide for the professional study, management, and interpretation of the area's archeological and historical resources.

The proposed archeological studies will correct deficiencies and inconsistencies in past survey records and aid in the acquisition of a reliable inventory of the area's archeological resources. The studies will provide information useful in the management and interpretation of the area's archeological resources and in future monument planning efforts. Surface collection of artifacts in connection with the proposed surveys will irreversibly alter the context of some archeological sites.

The ruins stabilization program will identify and document stabilization needs within the monument and insure the preservation of the area's ruins. In some cases stabilization efforts may replace or mask original ruins walls and alter cultural deposits in and surrounding the ruins.

The proposed rodent, vegetation, and arthropod control activities will aid in preserving the ruins and other historic structures. These actions will reduce rodent and arthropod pest populations within and in the immediate vicinity of the ruins. Native vegetation will be cleared from some areas.

Restoration of the old headquarters and museum cabin's exterior will prevent the continued deterioration of this structure. Restoration may require excavation of portions of the cultural deposits surrounding the structure.

The various studies proposed for the area's vegetation, soils and fauna and the acquisition of climatological data and aerial photographs will provide the monument with the kind of information necessary for the efficient management of the area's natural resources. The information obtained through these proposals will be valuable in future planning efforts for the monument. The proposed studies will require the collection of samples in some instances. In some cases sampling will entail the removal or stressing of a relatively small number of individuals within a species' population.

The identification of problem areas requiring research or other measures will insure an awareness of such problem areas and that action is taken as soon as feasible. Timely management actions, based on appropriate research, provide our best chances for preserving the monument's natural ecosystems.

The proposed fire history and ecology studies will determine the need for, and feasibility of, reestablishing fire in the monument. Upon completion of the studies a new fire management plan, following the guidelines presented in "Fire Management in the Western Region" will be developed and implemented. "Fire Management in the Western Region" contains a full discussion of the environmental impacts of fire management.

The interim suppression of all fires, prior to the development of the plan, may result in further ecosystem alterations from the natural state. However, this action should prevent any major short-term losses or damage to the area's resources.

The various visitor carrying capacity studies proposed will allow management to establish carrying capacities based on pertinent sociological and ecological data and principles. The studies will also determine the feasibility of allowing recreational uses not currently available in the monument. Initial carrying capacities may not be optimum but as additional information becomes available these figures will be adjusted to insure quality visitor experiences, preservation of the area's natural and cultural resources, and that provision is made for the maximum allowable visitor use consistent with the previous two elements.

The enforcement of visitor carrying capacities may reduce the freedom of visitors and potential visitors to use the area but will insure the area's continued preservation. Efforts directed at mitigating and compensating for visitor impacts will allow the monument's ecosystem to evolve, repair themselves, and survive in a relatively natural state.

Boundary fencing and signing will serve to clearly mark the boundary and prevent further trespass grazing within the monument. Fencing will have mixed effects on the area's wildlife. Fencing will eliminate competition between wildlife and domestic livestock within the monument but may limit the movement of some native species across boundary lines. Some natural resources will be disturbed during later maintenance activities. Vegetation will have to be removed along the fence line and the placing of fence posts will cause some soil disturbance.

Mitigating Measures Included in the Proposed Action

Surface artifacts encountered in connection with the proposed archeological surveys will be collected only when necessary to provide essential research data or to mitigate the impacts of construction or visitor use that cannot be otherwise avoided.

Efforts will be made to minimize any adverse effects on cultural deposits and natural resources surrounding ruins selected for stabilization. Pre-stabilization studies, including site mapping and field-note restudy, will minimize any loss of cultural information during stabilization.

Aerial tramways for transporting materials to the stabilization site will be constructed in those instances where they will minimize adverse impacts on the environment. If excavation of cultural deposits is necessary it will be conducted to a professionally adequate research design.

Where feasible, stabilization repairs will be made with an adobe mortar to maintain the original texture and appearance. Any rodent baits, pesticides, or herbicides employed to control rodents, arthropods, or vegetation in the ruins and other historic structures will be used in conformance with approved Department of the Interior procedures and regulations. Any required rodent bait station will be placed in locations inaccessible to children and out of the general public's view.

Prior to the restoration of the old headquarters and museum cabin's exterior an historic structures report will be prepared. All restoration work will conform to the specifications and guidelines presented in the report. The effects of restoration on the cultural deposits surrounding the structure will be evaluated in the report. If excavation of the fill is necessary it will be conducted to a professionally adequate research design.

In those studies where sampling requires the removal or stress of organisms, sample sizes will be limited to the minimum necessary for sound statistical analysis.

Clearing activities along the proposed boundary fence line will be kept to a minimum.

Prior to the initiation of an action requiring any ground disturbance a professional archeologist will conduct a survey of the area to be affected. Any identified materials of archeological significance will not be disturbed by the proposed action. If materials not identified by the survey are located subsequent to the survey, all work in the vicinity will cease until a professional archeologist can assess the situation.

Adverse Effects Which Cannot Be Avoided Should the Proposal Be Implemented

Surface collection of artifacts in connection with the proposed surveys will irreversibly alter the context of some archeological sites.

Stabilization efforts may replace or mask original ruins walls and alter cultural fill in and surrounding the ruins.

Vegetation, rodents and insects in historic structures will be removed or controlled by the proposed measures.

Any excavation required by the ruins stabilization or headquarters and museum cabin restoration proposals will permanently remove archeological evidence from the site.

Some of the proposed natural resource studies will require sampling that stresses or removes relatively small numbers of individuals from local species populations. While sampling may have major impacts on specific individuals, impacts on the populations involved will be minor.

The interim suppression of all fires, prior to the development and implementation of a new fire management plan, may result in ecosystem alterations from the natural state.

The enforcement of visitor carrying capacities may reduce the freedom of the visitors and potential visitors to use the area.

The proposed fencing may limit the movement of some wildlife across boundary lines.

Soils and vegetation will be disturbed by the proposed fencing activities.

The Relationship Between Short-Term Uses of Our Environment and the Maintenance and Enhancement of Long-Term Productivity

The monument's maximum long-term productivity can be realized through the above program providing for appropriate research and the restoration, preservation, and visitor enjoyment of the area's cultural and natural resources. No short-term uses which will interfere with this long-term productivity are proposed. The proposals limit short-term uses in order to provide for long-term productivity.

Irreversible and Irretrievable Commitments of Resources Which Would Be Involved in the Proposed Action

Any excavation of archeological or historical sites permanently commits and disrupts the context of these remains. This plan is intended to minimize excavation within the monument and insure optimum data recovery from necessary excavations by professionally adequate planning and research design.

Stabilization also has the effect of permanently altering or replacing historic fabric. Pre-stabilization study by site-mapping and field-note restudy is the equivalent of an historic structures report. This is intended to minimize loss of information during stabilization.

The proposed natural resource actions do not involve any irreversible or irretrievable commitments of resources other than the materials and labor required. The actions were designed to prevent any such irretrievable loss of the monument's natural resources. Due consideration has been given to prevent any losses of cultural resources.

Alternatives to the Proposed Action

Alternatives to the proposed archeological research include no action and conducting only a portion of the proposed studies. If no action is taken the monument will not obtain a reliable inventory of the area's archeological resources and deficiencies and inconsistencies in past survey records will not be corrected. If only a portion of the proposed studies are conducted only a fraction of the data necessary for the proper interpretation and management of the area's archeological resources will be obtained. If sites within the canyon's sustaining area outside the monument are not studied, the information they contain may be permanently lost. The Park Service cannot insure the preservation of sites external to the monument.

If no action is taken, as an alternative to the ruins stabilization proposal, specific stabilization needs will not be identified and those ruins requiring stabilization will not be stabilized. This would result in the gradual and irreversible deterioration of the ruins.

Alternatives to the proposed restoration of the old headquarters and museum cabin's exterior include no action, restoration of the exterior and interior, reconstruction of the entire structure and stabilization of the structure. If no action is taken the cabin will continue to deteriorate and the historic resource may be eventually lost. Restoration of the cabin's interior is not necessary as restoration of the exterior alone will provide the interior the protection needed to insure its preservation. Reconstruction would require the unnecessary destruction of historic materials in the cabin. Restoration of the structure's exterior offers the cabin's interior greater protection from the elements than would stabilization. Interpretive and functional uses of the cabin will be enhanced more by restoration than by stabilization.

The only alternative to the various natural resource studies proposed and the acquisition of climatological data and aerial photographs is that of no action. If these proposals are not implemented management will continue to lack the kind of information necessary for the efficient management of the area's natural resources. Problem areas may continue to develop and intensify while no action will be taken to identify or correct the situation.

Without the proposed fire history and ecology study fire cannot be safely restored to the ecosystem. Any attempt to reintroduce fire without such studies could be disastrous. If the study is not undertaken and no management action is taken, any unnatural conditions caused by the suppression of all fires in the area will continue and may intensify.

An alternative to aggressively suppressing all fires in the monument prior to development of a new fire management plan would be to take no action. This could result in major forest fires devastating the area.

Alternatives to the present proposal for establishment and enforcement of visitor carrying capacities include establishment of visitor carrying capacities without prior studies and no action. If carrying capacity figures are arbitrarily set without prior studies they may be too low, and thus not allow for the use the resources can handle, or too high, and thus result in resource deterioration. The no action alternative allows for the ultimate in visitor freedom but could eventually result in resource deterioration and declines in the quality of the visitor experience.

Alternatives to the boundary signing and fencing proposal include no action and posting but not fencing the boundary. Posting but not fencing the monument's boundary may control trespass hunting in the area but will have little or no effect on trespass grazing. If no action is taken trespass hunting and grazing will continue and trespass logging may occur. Some visitors will continue to be unaware of the monument's boundaries.

A general alternative which was considered in preparing the plan is to manage the area's resources to recreate the historic scene. This would require the identification of areas farmed by prehistoric inhabitants and the redevelopment of these areas to farmland. Once identified and redeveloped ancient farmlands would have to be maintained. Maintenance using modern, heavy equipment would create an intrusion on the historic scene. Maintenance of farmlands with modern hand tools or replicas of ancient tools is not feasible because of the human labor involved.

Restoring the historic scene would also require the reestablishment of a perennial flow through Walnut Canyon. This would necessitate obtaining water from Upper and Lower Lake Mary, which currently restrict the flow in the canyon and furnish water to the city of Flagstaff, or additional pumping from the monument's well. It is doubtful whether either or both of these supplies can furnish enough water to maintain a perennial flow. If a perennial flow cannot be maintained an alternative might be to maintain pools on the canyon bottom. These pools would provide water for the area's wildlife and show visitors that Walnut Canyon was not always so harsh an environment as now. It is not known whether the lakes or the monument's well can provide enough water for this alternative.

Restoration of the historic scene would require that the prehistoric mosaic of native vegetation be recreated in the area. The information currently available does not permit an assessment of this alternative's feasibility. Some of the plan's proposed studies will provide the kind of information which will enable a full evaluation of this alternative.

Consultation and Coordination

Prior to and during preparation of the resources management plan and environmental assessment, other agencies and individuals were consulted for their knowledge and recommendations.

Mr. Wayne Anderson, Wildlife Manager, Arizona Fish and Game Department was consulted regarding wildlife populations in the area. Mr. Dennis Lund, District Ranger, Coconino National Forest offered valuable comments on a wide variety of issues. Mr. Michael Salomonson of Northern Arizona University and Mr. James Ellis of East Flagstaff Junior High were also consulted.

The following organizations will receive informational copies of the plan and environmental assessment:

Arizona Fish and Game Department
Atchison, Topeka and Santa Fe Railway Company
Coconino National Forest
Museum of Northern Arizona
Sierra Club
University of Northern Arizona, College of Public Environmental Services

All letters of comment received will be reviewed by the Superintendent for implementation. Copies of the assessment and public comments will be available at Walnut Canyon National Monument and the National Park Service's Western Regional Office.

The following letter of comment was received on the draft resources management plan.

ARIZONA STATE PARKS
1688 West Adams
Phoenix, Arizona 85007
Telephone 271 – 4174
DENNIS McCARTHY, Director
WALLACE VEGORS, Assistant Director

RAUL H. CASTRO
Governor

STATE PARKS BOARD MEMBERS:
RALPH G. BURGBACHER, Chairman
A.C. WILLIAMS, Vice Chairman
DUANE MILLER, Secretary
DELL TRAILOR, B. MARC NEAL
RICKI RARICK, ANDREW L. BETTWY

Dennis McCarthy, State Historic Preservation Officer
State and National Registers of Historic Places

January 30, 1975

Mr. Lyle H. McDowell
Acting Regional Director
Western Region
National Park Service
Department of the Interior
450 Golden Gate Avenue
San Francisco, California 94102

Ref: N2215 (WR) PSN

Dear Mr. McDowell:

The resources management plan and environmental assessment has been reviewed for cultural resource management content. The State Historic Preservation Officer has the following comments:

1. Archaeological research. The survey and inventory of resources is a positive step toward compliance with Executive Order 11593 and interpretation of the total story of man's adaptation to Walnut Canyon.

2. Stabilization of ruins. Under Adverse Effects, some concern is generated from the statement "Stabilization efforts may replace or mask original ruins walls ---."

3. Restoration of the old headquarters and museum cabin. The plan to rehabilitate the building which is in the process of being nominated to the National Register of Historic Places is needed in order to insure further deterioration. Presumably, the historic structures report will clarify what is to be restoration and what is stabilization of the structure.

4. Land exchanges, acquisitions and boundary survey. The proposed exchanges and acquisitions appear to improve resource management administratively as well as bring other cultural resources within the boundaries of the monument. Santa Fe Dam was inventoried by National Forest Service personnel in 1973. In August of 1974, the Arizona Historic Sites Review Committee approved the structure for nomination to the National Register at the local level of significance. On October 8, 1974, the signed forms were returned to the Forest Service. Should it be determined that Santa Fe Dam is within the monument boundaries, please advise so that our records may be adjusted.

Thank you for the opportunity to comment on the management plans.

Sincerely,

DENNIS McCARTHY
State Parks Director

Dorothy Hall

Dorothy H. Hall
Historic Sites
Preservation Officer

DHH:oml

Department of the Interior

National Park Service

NEGATIVE DECLARATION

WALNUT CANYON NATIONAL MONUMENT, ARIZONA

Western Region

In compliance with the National Environmental Policy Act of 1969, the National Park Service has prepared an environmental assessment on the following proposed project:

Natural and Cultural Resources
Management Plan
Walnut Canyon National Monument

The assessment process did not indicate a significant environmental impact from the proposed action. Consequently, an environmental statement will not be prepared.

9/29/75
Date

Superintendent

10/6/75
Date

General Superintendent
Southern Arizona Group

12/21/76
Date

ACTING Regional Director
Western Region

MANAGEMENT PROGRAM

The management program appended to the plan is the action document designed to implement the plan. The management program consists of:

A List of Natural and Cultural Resources Projects on which currently active and proposed resource activities are summarized.

Natural and Cultural Project Statements that serve as "blueprints" for proposed actions.

Natural and Cultural Resources Project Programming Sheets on which each project is listed and shown in relation to park priority, funding, and manpower requirements, and a time sequence for the five-year period.

While the resources management plan is concerned with a proposed long-term action program, the management program deals with the next five years only. The program presented here begins with Fiscal Year 1977. Each subsequent year, the management program will be revised and updated for a new five-year period as work is completed and new projects are proposed.

LIST OF RESOURCES PROJECTS

Reference Number	Project Title	Project Status
RM-1	Acquire Aerial Photographs and Prepare Photomosaic	3 years to completion
RM-2	Boundary Fencing and Signing	2 years to completion
N-1	Climatic and Air Quality Data	5 years to completion
N-2	Vegetation and Soil Survey	4 years to completion
N-3	Visitor Carrying Capacity	5 years to completion
N-4	Forest Insect and Disease Inventory and Ecology	5 years to completion
N-5	Vertebrate Inventory	5 years to completion
N-6	Fire History, Ecology, and Management	5 years to completion
N-7	Impact of Sinaguan & Post-Sinaguan Man on the Ecosystem	3 years to completion
N-8	Animal Ecology	5 years to completion
H-1	Historic Structure Rehabilitation	5 years to completion
A-1	Archeological Site Survey	2 years to completion
A-2	Ruins Stabilization	continuing

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Walnut Canyon National Monument, Western Region.

2. PROJECT NAME AND NUMBER: Aerial Photographs, WACA RM-1.

3. STATEMENT OF PROBLEM:

Aerial photographs of the monument are a high priority need. They are needed to complete the vegetative and soil maps, and for use in the archeological site survey. Aerial photographs would also expedite many of the other proposed projects and studies.

4. WHAT HAS BEEN DONE:

Some old aerial photographs that cover portions of the monument are available.

5. DESCRIPTION OF THE WORK TO BE UNDERTAKEN:

The National Park Service Science Center will be contacted to determine what aerial photographs of the monument are available. Aerial photographs of the entire monument will be acquired. The photos will be in color, suitable for stereo use, and in a scale of 1"=800'. An orthophoto map, a photomosaic adjusted for true scale during printing, will be prepared for the monument.

6. LENGTH OF TIME NEEDED:

One day to fly the area, and two months processing time.

7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN:

If aerial photos are not obtained, compilation of a number of the area's resource maps, including vegetative and soil maps will be very difficult. Extra field work would be required on many projects.

8. WHAT ARE THE ALTERNATIVES: No action.

9. PERSONNEL: U.S. Marine Corps or contract personnel.

10. ADMINISTRATION AND LOGISTICS:

Funding

a. If obtained through U.S. Marine Corps' Aerial Photography school, there would possibly be no cost, or a minimal cost for processing.

b. By U.S. Geological Survey or commercial company.

	Year in Program Sequence				
	1st	2nd	3rd	4th	5th
Personal Services (Contract)	2,500				
Other than Personal Services	3,000				
Grand Total	5,500				
Funds Available in Park Base	0				
Funds Requested from Regional Office	5,500				

On Form Date Submitted

11. REFERENCES AND CONTACTS:

Mary Lou Brown, U.S. Geological Survey, Prescott, Arizona.

U.S. Marine Corps Aerial Photography School, Yuma, Arizona.

12. DATE OF SUBMISSION: June 30, 1974

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Walnut Canyon National Monument, Western Region.

2. PROJECT NAME AND NUMBER: Boundary Fencing and Signing, WACA RM-2.

3. STATEMENT OF PROBLEM:

Approximately four miles of the monument's boundaries are unfenced. This includes approximately half of the northern boundary, all of the eastern boundary and half of the southern boundary. Some existing boundary fences are not accurately located. Boundary signing and fencing are needed to prevent trespass grazing, logging, sport hunting, and pot hunting in the area.

4. WHAT HAS BEEN DONE:

As noted above, portions of the monument's boundaries are unfenced. Most of the boundary has been roughly located and posted with boundary markers.

5. DESCRIPTION OF WORK TO BE UNDERTAKEN:

Currently unfenced sections of the monument's boundary will be fenced subsequent to the boundary survey. Approximately eight miles of old fence will be relocated to the boundary. All fences will be constructed to BLM standards. Boundary signs will be placed.

6. LENGTH OF TIME NEEDED: Three to four months.

7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN:

Some existing boundary fences will remain inaccurately located. Where there is no fence, the boundary will be marked by signs alone. Trespass grazing will continue. Unintentional trespass sport hunting, pot hunting, and logging may occur.

8. WHAT ARE THE ALTERNATIVES:

a. No action.

b. Fence unfenced sections and do not move mislocated fences.

9. PERSONNEL: Work will be accomplished by contract personnel.

10. ADMINISTRATION AND LOGISTICS:

Funding	Year in Program Sequence				
	1st	2nd	3rd	4th	5th
Personal Services (Contract)	9,000				
Other than Personal Services	0				
Grand Total	9,000				
Funds Available in Park Base	0				
Funds Requested from Regional Office	9,000				

On Form	Date Submitted
10-238	10/15/69 (Southwest Region)

11. REFERENCES AND CONTACTS:

12. DATE OF SUBMISSION: June 30, 1974.

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Walnut Canyon National Monument, Western Region.

2. PROJECT NAME AND NUMBER: Climatic and Air Quality Data, WACA N-1.

3. STATEMENT OF PROBLEM:

Only limited climatological data is collected at the area's weather station. More complete data is needed to properly assess resource status, trends, and interrelationships in the area. Monitoring of air quality is necessary to establish baseline data and insure that management is aware of future changes in air quality.

4. WHAT HAS BEEN DONE:

Weather data is collected daily at 1700. Such data has been collected since 1966. Precipitation and minimum, maximum and at observation temperatures are recorded.

5. DESCRIPTION OF THE WORK TO BE UNDERTAKEN:

Additional weather instruments will be obtained. In addition to the data currently collected, relative humidity, wind speed and direction, and fuel stick moisture will be read daily. The reading time may be changed to 1300. Air quality data will be collected.

6. LENGTH OF TIME NEEDED: Continuing.

7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN:

Incomplete data will continue to be obtained.

8. WHAT ARE THE ALTERNATIVES:

No action. Adequate climatological data will not be available for the area.

9. PERSONNEL: Park staff.

10. ADMINISTRATION AND LOGISTICS:

Funding	Year in Program Sequence				
	1st	2nd	3rd	4th	5th
Personal Services	0				
Other than Personal Services	4,000				
Grand Total	4,000				
Funds Available in Park Base	0				
Funds Requested from Regional Office	4,000				

On Form Date Submitted

11. REFERENCES AND CONTACTS: U.S. Weather Bureau.

12. DATE OF SUBMISSION: June 30, 1974.

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Walnut Canyon National Monument, Western Region.

2. PROJECT NAME AND NUMBER: Vegetation and Soil Survey, WACA N-2.

3. STATEMENT OF THE PROBLEM:

   Management and interpretation of the area's vegetation and soils have been hampered by a lack of information on these resources.

4. WHAT HAS BEEN DONE: A plant species list has been prepared for the monument.

5. DESCRIPTION OF THE WORK TO BE UNDERTAKEN:

   After aerial photographs of the area are obtained, vegetation and soil units will be delineated on the photographs. Ground surveys will determine composition, density, and homogeneity of the vegetative units. Successional relationships between the units will be determined. Any unique or threatened plant species and/or communities will be identified. The accompanying soil survey will identify soil series and types, provide for each series a profile description, and discuss physical and chemical properties in relation to plant growth. Soil and vegetation maps will be prepared.

6. LENGTH OF TIME NEEDED: One year.

7. WHAT WILL HAPPEN IF NOT UNDERTAKEN:

   Management will continue to manage the area without adequate knowledge of the vegetation and soil resources.

8. WHAT ARE THE ALTERNATIVES: No action.

9. PERSONNEL:

   This study could best be accomplished by contract with ecologists at a local institution.

10. ADMINISTRATION AND LOGISTICS:

Funding	Year in Program Sequence				
	1st	2nd	3rd	4th	5th
Personal Services (Contract)		12,000			
Other than Personal Services		3,000			
Grand Total		15,000			
Funds Available in Park Base		0			
Funds Requested from Regional Office		15,000			

On Form Date Submitted

11. REFERENCES AND CONTACTS:

Haldeman, John and A. B. Clark. 1969. Walnut Canyon: an example or relationships between birds and plant communities. Plateau. 41 (4).

12. DATE OF SUBMISSION: June 30, 1974.

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Walnut Canyon National Monument, Western Region.

2. PROJECT NAME AND NUMBER: Visitor Carrying Capacity, WACA N-3.

3. STATEMENT OF THE PROBLEM:

At present there are four areas open to visitor use: the Visitor Center, the Rim Trail, the Island Trail and the Picnic Area. The capacity for visitor use of these areas has not been determined. The capacity for visitor use (if one exists) for unopened areas such as the canyon bottom, the old headquarters cabin, and potential interpretive trail sites has not been determined. If present open areas become overused, the visitor carrying capacity of other areas must be known before they are opened to the public.

4. WHAT HAS BEEN DONE:

Visitor use is now restricted to certain limited developed areas: the Visitor Center, the Rim Trail, the Island Trail, and the Picnic Areas. No study of visitor impact on these areas or on presently closed areas with high interpretive value has been made.

5. DESCRIPTION OF THE WORK TO BE UNDERTAKEN:

There will be several sub-projects emphasized:

a. Rotating use in current open areas to provide baseline data for impacts of light and heavy visitation.

b. Evaluating the influence of various management techniques (ex., to pave or not to pave) on carrying capacity.

c. Establishing maximum allowable visitation levels in current use areas and evaluating present use in that context.

d. Investigating current closed areas with high interpretive values and establishing potential visitor use levels for those areas.

6. LENGTH OF TIME NEEDED: Three years.

7. WHAT WILL HAPPEN IF NOT UNDERTAKEN:

In the future, as at present, the level of visitor use will not be able to be compared to maximum allowable limits, since no limits will be known. The areas presently in use may become too heavily used in the future and degradation of the resources

may occur. The impact of opening new areas for interpretation or other uses will not be known in advance.

8. WHAT ARE THE ALTERNATIVES:

a. No action.

b. Do not conduct study and impose arbitrary visitor limitations.

9. PERSONNEL:

This study should be contracted with personnel from a local institution.

10. ADMINISTRATION AND LOGISTICS:

Funding	Year in Program Sequence				
	1st	2nd	3rd	4th	5th
Personal Services (Contract)		7,000	7,000	7,000	
Other than Personal Services		1,000	1,000	0	
Grand Total		8,000	8,000	7,000	
Funds Available in Park Base		0	0	0	
Funds Requested from Regional Office		8,000	8,000	7,000	

On Form Date Submitted

11. REFERENCES AND CONTACTS:

12. DATE OF SUBMISSION: June 30, 1974.

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Walnut Canyon National Monument, Western Region.

2. PROJECT NAME AND NUMBER:

Forest Insect and Disease Inventory and Ecology, WACA N-4

3. STATEMENT OF PROBLEM:

The monument's forest insects and disease organisms have been only partially inventoried. Current gaps in our knowledge of these resources precludes their proper interpretation and establishment of an effective management program.

4. WHAT HAS BEEN DONE:

An unauthenticated and incomplete insect collection has been compiled. The USFS has identified Douglas-fir beetles and done some control work in the area.

5. DESCRIPTION OF WORK TO BE UNDERTAKEN:

The identification of all specimens in the current insect collection will be checked. New specimens will be added to the collection and efforts will be made to identify the majority of the area's insect species. Special attention will be given to the identification of those species which adversely affect the area's trees. Problem areas requiring further research will be identified and appropriate studies will be proposed.

Forest diseases in the area will be identified, along with the magnitude of the infection. Recommendations for the management of both forest insects and pests and diseases will be sought.

6. LENGTH OF TIME NEEDED: Two years.

7. WHAT WILL HAPPEN IF NOT UNDERTAKEN:

The monitoring of forest insect pests and diseases will only be reactionary and when their impacts are readily apparent to a layman monitor. Interpretation would lack complete data for answering visitor questions and for interpretive talks and walks.

8. WHAT ARE THE ALTERNATIVES:

a. No action.

b. Initiate control work without any studies.

9. PERSONNEL: Contracted, research personnel.

10. ADMINISTRATION AND LOGISTICS:

Funding	Year in Program Sequence				
	1st	2nd	3rd	4th	5th
Personal Services (Contract)		4,000	4,000		
Other than Personal Services		1,000	1,000		
Grand Total		5,000	5,000		
Funds Available in Park Base		0	0		
Funds Requested from Regional Office		5,000	5,000		

On Form Date Submitted

11. REFERENCES AND CONTACTS:

12. DATE OF SUBMISSION: June 30, 1974

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Walnut Canyon National Monument, Western Region.

2. PROJECT NAME AND NUMBER: Vertebrate Inventory, WACA N-5.

3. STATEMENT OF PROBLEM:

The monument staff lacks sufficient knowledge of the area's vertebrate fauna to adequately manage and interpret the resource.

4. WHAT HAS BEEN DONE:

Current checklists of the mammals and birds have been prepared. An incomplete reptile list has also been prepared. No such lists have been prepared for the amphibians. Inadequate and often unreliable records of sightings have been kept since 1936.

5. DESCRIPTION OF THE WORK TO BE UNDERTAKEN:

A general survey of the monument's vertebrates will be conducted. Checklists will be developed for the monument's birds, reptiles, and amphibians. Habitat associations and the seasonal nature of occurrence will be noted for all species. Rare, unique, and threatened species will be identified. As problems are identified, research proposals will be developed to deal with these.

6. LENGTH OF TIME NEEDED: Two years.

7. WHAT WILL HAPPEN IF NOT UNDERTAKEN:

The monument staff will continue to manage the resource without adequate knowledge.

8. WHAT ARE THE ALTERNATIVES:

a. Do nothing.

b. Develop checklist only.

9. PERSONNEL: From local research institution.

10. ADMINISTRATION AND LOGISTICS:

Funding	Year in Program Sequence				
	1st	2nd	3rd	4th	5th
Personal Services (Contract)			4,000	4,000	
Other than Personal Services			1,000	0	
Grand Total			5,000	4,000	
Funds Available in Park Base			0	0	
Funds Requested from Regional Office			5,000	4,000	

On Form Date Submitted

11. REFERENCES AND CONTACTS:

Salomonson, Michael G. 1973. Checklist of mammals of Walnut Canyon National Monument. Plateau.46 (1).

12. DATE OF SUBMISSION: June 30, 1974.

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Walnut Canyon National Monument, Western Region.

2. PROJECT NAME AND NUMBER:

Forest Fire History, Ecology and Management Study, WACA N-6.

3. STATEMENT OF PROBLEM:

Man-caused and naturally occurring forest fires have been aggressively suppressed since Walnut Canyon was established as a national monument. These suppression activities have interrupted and influenced the natural role of fire in forest succession and the ecology of the area. The suppression efforts have led to an unnatural and heavy build-up of forest litter. It is not known whether fire can be allowed to resume its natural role.

4. WHAT HAS BEEN DONE:

There are minimal and inadequate forest fire records for the monument, as a part of fire suppression efforts.

5. DESCRIPTION OF THE WORK TO BE UNDERTAKEN:

Phase 1: Collect past fire history data from USFS for adjacent forest areas. Date fires within the monument from fire scarred trees. Gather National Fire Danger Rating System data for a five year period. Survey and map the heavy concentrations of unnatural fuel litter within the monument.

Phase 2: With corroboration from the USFS, devise appropriate fire management policies and procedures. Establish a revised cooperative agreement for letting natural fires go when conditions allow it, and for using prescribed fire for removing fuel build-ups, if the studies indicate this to be the best policy.

Phase 3: Put agreement and procedures into effect, and monitor results.

6. LENGTH OF TIME NEEDED:

Five years for phases 1 and 2. If prescription burns or a let burn policy is agreed upon, phase 3 would then be a recurring program.

7. WHAT WILL HAPPEN IF NOT UNDERTAKEN:

The unnatural conditions caused by suppression, and the continued increase in fire hazards due to litter build-up will persist.

The potential for a holocaust fire will be greater than if fuels are not allowed to accumulate unnaturally.

8. WHAT ARE THE ALTERNATIVES:

a. Continue suppression activities indefinitely.

b. Have prescribed burns and let burn policy without study.

c. No action; no suppression, protection, or studies.

9. PERSONNEL:

Can be undertaken by park staff personnel with consultation with biologist in WRO and USFS.

10. ADMINISTRATION AND LOGISTICS:

Funding	Year in Program Sequence				
	1st	2nd	3rd	4th	5th
Personal Services			7,000	7,000	5,500
Other than Personal Services			1,000	1,000	500
Grand Total			8,000	8,000	6,000
Funds Available in Park Base			0	0	0
Funds Requested from Regional Office			8,000	8,000	6,000

On Form Date Submitted

11. REFERENCES AND CONTACTS:

12. DATE OF SUBMISSION: June 30, 1974.

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Walnut Canyon National Monument, Western Region.

2. PROJECT NAME AND NUMBER:

The Impact of Sinaguan and Post-Sinaguan Man on the Ecosystem, WACA N-7.

3. STATEMENT OF PROBLEM:

No ethno-biological studies have been undertaken at Walnut Canyon National Monument. The Sinaguan impact on the area's ecosystem is merely speculation. White man's impact on the area is only partly known, i.e., there were cattle grazed to a minor extent, and sheep grazing to a major extent in the early 1900s. Just how much this practice set back or changed the ecological successional processes is unknown. The Sinaguan influences on the environment are valid because of the area's historical/archeological designation. White man's impact is invalid and should be corrected where possible.

4. WHAT HAS BEEN DONE:

The impact of historic times has been recorded in various ways and in various locations throughout the years. Walnut Canyon has a fact file which has attempted to accumulate some of this information. Interviews with pioneer residents have been taped and transcribed.

5. DESCRIPTION OF WORK TO BE UNDERTAKEN:

a. Ethno-biological studies to determine the extent of Sinaguan impact on the environment during the period of occupation.

b. Library research for references to historic uses and impacts on Walnut Canyon.

c. Personal interviews with old-time residents of Flagstaff area to obtain information about the pioneer days of the area.

d. Study the local ecology of the various forest types within Walnut Canyon and other vegetative communities.

e. Study the impact of developed facilities within the area, since under government control and administration.

f. Identify cultural elements and patterns of human use.

6. LENGTH OF TIME NEEDED: Two to three years.

7. WHAT WILL HAPPEN IF NOT UNDERTAKEN:

One of the primary Natural Resources Management Objectives for Walnut Canyon is, "... minimize, or control those changes in the native environment resulting from historic man's (non-Sinaguan) influences on the natural processes of ecological succession. Native environmental complexes will be protected and managed ... at levels determined through archeological and ecological research ... to be appropriate." This primary management objective cannot be approcahed or obtained without the knowledge and information to be obtained by this proposed project.

8. WHAT ARE THE ALTERNATIVES:

a. No action.

b. Approach the sub-projects as separate projects.

9. PERSONNEL:

A combination of Archeological Center personnel, Walnut Canyon personnel, contracted research personnel, and regional professional personnel.

10. ADMINISTRATION AND LOGISTICS:

Funding	Year in Program Sequence				
	1st	2nd	3rd	4th	5th
Personal Services (estimate)				9,000	9,000
Other than Personal Services				2,500	2,500
Grand Total				11,500	11,500
Funds Available in Park Base				0	0
Funds Requested from Regional Office				11,500	11,500

On Form Date Submitted

11. REFERENCES AND CONTACTS:

12. DATE OF SUBMISSION: June 30, 1974

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Walnut Canyon National Monument, Western Region.

2. PROJECT NAME AND NUMBER: Animal Ecology, WACA N-8.

3. STATEMENT OF THE PROBLEM:

   The monument staff recognizes that many problems exist in this area but has yet to identify species. Some large predators exist in the area but we have no knowledge of how to provide for their preservation. The elimination of flow in Walnut Creek many years ago may have had adverse effects on resident wildlife populations. Outside influences on the monument's wildlife are unknown.

4. WHAT HAS BEEN DONE: No research has been conducted.

5. DESCRIPTION OF THE WORK TO BE UNDERTAKEN:

   This project proposes to carry out research in problem areas identified in the Vertebrate Inventory (N-5). The park envisions research on such problems as predator management, water and wildlife, effects of factors external to the park on resident wildlife, etc.

6. LENGTH OF TIME NEEDED:

   On year in current five-year sequence. Continuing in future.

7. WHAT WILL HAPPEN IF NOT UNDERTAKEN:

   The monument will have identified areas where research is necessary for efficient management but the research will not be accomplished.

8. WHAT ARE THE ALTERNATIVES:

   No action; do not use information acquired in vertebrate inventory.

9. PERSONNEL: Local research institution.

10. ADMINISTRATION AND LOGISTICS:

Funding	Year in Program Sequence				
	1st	2nd	3rd	4th	5th
Personal Services					5,000
Other than Personal Services					0
Grand Total					5,000
Funds Available in Park Base					0
Funds Requested from Regional Office					5,000

On Form Date Submitted

11. REFERENCES AND CONTACTS:

12. DATE OF SUBMISSION: June 30, 1974

CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Walnut Canyon National Monument, Western Region.

2. PROJECT NAME AND NUMBER: Historic Structures Rehabilitation, Old Headquarters, WACA-H-1.

3. STATEMENT OF PROBLEM:

   The Old Headquarters is in very bad condition and is in need of exterior restoration to preserve it as an historic resource.

4. WHAT HAS BEEN DONE: The structure has received no attention or maintenance beyond re-shingling the roof since construction.

5. DESCRIPTION OF THE WORK TO BE UNDERTAKEN:

   It is not necessary to restore the interior of the cabin, but the exterior needs restoration. To this end any stabilization work that is necessary will be performed: the construction of a masonry or concrete foundation to support existing walls, chinking and grouting, if needed, chemical preservation treatments where necessary, etc. All work will conform to the specifications and guidelines established in the Historic Structures Report which is required prior to any construction work. Effects of such rehabilitation on the cultural fill around the structure will be evaluated, and if excavation is required it will be conducted to a professionally adequate research design.

6. LENGTH OF TIME NEEDED: Two years.

7. WHAT WILL HAPPEN IF PROJECT IS NOT UNDERTAKEN:

   The historic resource, nominated to the National Register of Historic Places, would continue to deteriorate until totally lost. Failure to provide the necessary protection would be failing to fulfill the existing requirements of federal legislation regarding such historic resources.

8. WHAT ARE THE ALTERNATIVES:

   1. No action.

   2. Perform "holding-action" preservation.

   3. Not only exterior, but also interior, rehabilitation of the structure.

9. WHO WILL ACCOMPLISH THE PROJECT:

The Office of Archeology and Historic Preservation, WASO or the Division of Cultural Properties Conservation, Arizona Archeological Center.

10. ADMINISTRATION AND LOGISTICS OF THE PROJECT:

Funding	Year in Program Sequence 1st	2nd	3rd	4th	5th
Personal Services	2,500	11,500			
Other than Personal Services	0	0			
Grand Total	2,500	11,500			
Funds Available in Park Base	0	0			
Funds requested from Regional Office	2,500	11,500			

On Form	Date Submitted
10-238 Package #107	8/72

11. MANAGEMENT AND EVALUATION STATUS:

	Required	Done
a. List of Classified Structures	X	X
b. Nomination to National Register of Historic Places	X	X
Section 106 Report	X	
c. Historic Structures Report	X	

12. REFERENCES AND CONTACTS:

1. Arizona Archeological Center
2. F. Ross Holland, Jr., NARO, NPS.

13. DATE OF SUBMISSION: June 30, 1974.

CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Walnut Canyon National Monument, Western Region.

2. PROJECT AND NUMBER: Archeological Site Survey, WACA-A-1.

3. STATEMENT OF PROBLEM:

Past surveys of the monument have not systematically covered some localities, and survey records and maps are inconsistent, often unreliable, and incomplete. While there have been some surveys outside the monument to provide interpretive background in areas beyond the arbitrary boundaries of the monument, there is no adequate archeological inventory or base map. There are a number of deficiencies in the interpretive background of the monument which can be corrected through survey.

4. WHAT HAS BEEN DONE: Before the area became a national monument, Dr. Harold S. Colton surveyed the vicinity, primarily within the canyon. More recent surveys have been done on the north rim (Van Valkenburgh) and the south rim (Euler). Euler's survey was done with systematic controls and apparently is comprehensive; Van Valkenburgh's north rim survey was carried out in the winter when the ground was partially snow-covered, and she appears to have been selective in the locations investigated. Later survey has identified check-dams which were apparently ignored earlier. Mapping, when done, has been inaccurate and unreliable.

5. DESCRIPTION OF THE WORK TO BE UNDERTAKEN:

(a) Comprehensive analysis of records from previous survey to identify deficiencies; (b) re-survey of the north rim, including terrace dams, and collection soil for pollen analysis to investigate possible plant cover changes during the Elden phase; (c) expand survey of the south rim into canyons described by Euler's report; (d) re-visit and re-record sites within the canyon; (e) conduct sampling survey beyond the monument boundaries adequate to obtain a reliable patter of site distribution relative to canyon-rim environment (Figure 2); (f) prepare an archeological base map; (g) prepare a report dealing with the following topics, at a minimum---seasonal changes in settlement, field locations, check-dam distribution and use, locations of clay deposits used by canyon and rim inhabitants, the relationship between settlement and the sustaining area during the prehistoric occupation of Walnut Canyon, population estimates for all periods of the Canyon's occupation, distribution and interpretation of petrographic art, chronology of ledge ruins--if more research is needed to explore these questions, the survey report should provide specific research proposals to do this.

6. LENGTH OF TIME NEEDED: Five months field time, seven months for analysis and report.

7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN: Without the proposal an accurate and complete inventory and archeological base map, based on site surveys, will not be available. Without such an inventory and base map the area's cultural resources cannot be properly managed.

8. WHAT ARE THE ALTERNATIVES: No action.

9. PERSONNEL: This project could be accomplished by a contract with an organization such as the Northern Arizona University or the Museum of Northern Arizona. The Arizona Archeological Center can negotiate such a contract.

10. ADMINISTRATION AND LOGISTICS:

Funding	Year in Program Sequence 1st	2nd	3rd	4th	5th
Personal Services	10,000				
Other than Personal Services	0				
Grand Total	10,000				
Funds Available in Park Base	0				
Funds Requested from Regional Office	10,000				

On Form	Date Submitted
10-238	July 31, 1972

11. REFERENCES AND CONTACTS:

1. Sam Henderson, Casa Grande Ruins New Mexico

2. Arizona Archeological Center

12. DATE OF SUBMISSION: August 31, 1973.

CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Walnut Canyon National Monument, Western Region.

2. PROJECT AND NUMBER: Ruins Stabilization, WACA-A-2.

3. STATEMENT OF PROBLEM: Walnut Canyon includes approximately 300-400 individual cliff-dwelling rooms. Masonry walls were built of unfaced, random limestone; rocks laid double in clay mortar and plasted with clay. Destruction in the more accessible ruins has been due to: (1) vandalism; (2) cattle; and (3) weather. Front walls are not bonded to the partition walls, and collapse easily.

4. WHAT HAS BEEN DONE: The objectives of the on-going stabilization program thus far, have been to (1) maintain those sites along trails receiving heavy visitor traffic; and (2) to stabilize sites in view from either the visitor center or interpretive trails. Stabilization at the monument is slow, expensive and arduous because access to the ruins is difficult. The most convenient method, so far, has been the use of an aerial tramway system with its terminal end positioned near the site to be stabilized. This mechanical method leaves no irreversible scars on the landscape.

5. DESCRIPTION OF THE WORK TO BE UNDERTAKEN:

Basic maintenance stabilization should include the following:

a. Inspection of sites and documentation of stabilization needs;

b. Minor repairs, as needed, to maintain the ruins in good condition;

c. Resetting loose stone, grouting and repairing cracks and separations in wall construction;

d. Controlling rodent populations where their presence and activities present potential damage to the ruins;

e. Treatment of original or replacement wood in the ruins with a pesticide or preservative;

f. Where possible, in those ruins where there is no visitation, stabilization repair should be made with an adobe mortar to maintain an original texture and appearance. In sites that have heavy visitation, repairs may be made with a tinted cement to achieve the strength needed to withstand visitor impact.

Priority of stabilization work

Sites NA7 739-NA743--heavy visitation of these sites on the Island Trail demands that they be scheduled for major maintenance stabilization every 5-10 years and be inspected annually to forestall any potential problems before they endanger the site or visitors. Their last stabilization was in 1973.

Sites NA 103 and NA 476--heavy visitation of these sites in connection with the park's interpretive program requires that they be submitted to annual inspection and cyclical maintenance every 5-10 years.

Sites NA 331-NA 338--these sites are directly visible from the visitor center. They are not subject to visitor traffic, however, so their stabilization is less urgent, but still advised. Annual or bi-annual inspection is recommended with cyclical maintenance (5-10 years). Excavation could be scheduled with stabilization in the future.

Sites NA 317-NA 326-NA 330; NA 748--these sites are not on an open trail currently, but the trail may become part of the interpretive system in the future. They are visible from the Island Trail and the visitor center. NA 317, NA 318, and NA 324 are almost totally destroyed. 5-10-year cyclical maintenance with annual inspection is recommended unless the sites do become part of a new interpretive trail, in which case, a more intensive stabilization program should be instituted.

Sites NA 396, NA 397, NA 398, NA 400, NA 401, NA 747--visible from the Island Trail, these sites should be inspected annually and receive 5-10-year cyclical stabilization.

Sites NA 745, NA 746, NA 394, NA 395--visible from the North Rim Overlook and the Island Trail. NA 746 is rare in that it is one of the few two-room-deep structures in the canyon. These sites are highly inaccessible to maintenance stabilization but should be included in a 5-10-year cyclical program, regardless.

Sites NA 300-NA 313--only partly visible with no visitation. Should be a stabilization program for them, though, and as soon as possible. Their low visitor use mitigates against their priority for preservation, but they are important to an interpretive program, and should be stabilized. It is important that there be an inspection here prior to stabilization in order to maintain and preserve as much of the original material as possible.

6. LENGTH OF TIME NEEDED: This is an ongoing project. Major stabilization time requirements will depend on available funding and size of crew.

7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN: Failure to keep up cyclical maintenance may result in irreversible loss of the very cultural resources that Walnut Canyon National Monument was created to preserve.

8. WHAT ARE THE ALTERNATIVES: No action.

9. WHO WILL ACCOMPLISH THE PROJECT: Inspection and basic maintenance is the responsibility of the area. Major stabilization can be accomplished by Ruins Stabilization Office, Arizona Archeological Center, or they can negotiate a contract with a suitable institution.

10. ADMINISTRATION AND LOGISTICS: Existing reports prepared by the Ruins Stabilization Office should serve as adequate guidelines for any maintenance stabilization projects.

	Year in Program Sequence				
Funding	1st	2nd	3rd	4th	5th
Personal Services	11,200				
Other than Personal Services					
Grand Total	11,200				
Funds Available in Park Base					
Funds Requested from Regional Office	11,200				

On Form Date Submitted

11. MANAGEMENT AND EVALUATION STATUS:

	Required	Done
a. Section 106 Report	X	
b. Environmental Assessment on Existing Data	X	
By Professional Inspection of Site	X	
c. Historic Structures Report	X	

12. REFERENCES AND CONTACTS:

1. Walnut Canyon National Monument
2. Southern Arizona Group
3. Arizona Archeological Center

13. DATE SUBMITTED: June 30, 1974.

CULTURAL AND NATURAL RESOURCES PROJECTS PROGRAMMING SHEET

WALNUT CANYON NATIONAL MONUMENT, Arizona

January 1976

NPS Costs Expressed in $1000

Increase or Package No.	Area Priority	Reference No.	Project Title	Yr. 1 (77) BASE*	Yr. 1 (77) NEW**	Yr. 2 (78) BASE	Yr. 2 (78) NEW	Yr. 3 (79) BASE	Yr. 3 (79) NEW	Yr. 4 (80) BASE	Yr. 4 (80) NEW	Yr. 5 (81) BASE	Yr. 5 (81) NEW	Form No. & Date 10-250	Form No. & Date 10-237	Form No. & Date 10-238	No. of Contract
	1	A-2	Ruins Stabilization	0	11.2									on-going projects			
	2	A-1	Archeological Site Survey			0	10.0								1/76	7/72	
	3	RM-2	Boundary Fencing & Signing			0	9.0									10/69	
	4	N-7	Impact of Sinaguan & Post-Sinaguan Man on the Ecosystem			0	11.5	0	11.5								
	5	RM-1	Aerial Photos					0	5.5								
	6	H-1	Historic Structure Rehab.							0	2.5	0	11.5			8/72	
	7	N-4	Forest Insect- Disease Inventory & Ecology							0	5.0	0	5.0				
	8	N-3	Visitor Carrying Capacity					0	8.0	0	8.0	0	7.0				
	9	N-2	Vegetation - Soil Survey							0	15.0						
	10	N-5	Vertebrate Inventory							0	5.0	0	4.0				
	11	N-8	Animal Ecology									0	5.0				
	12	N-6	Fire History, Ecology & Management					0	8.0	0	8.0	0	6.0				
	13	N-1	Climatic & Air Quality Data									0	4.0				

*BASE - Funds Available in Park Base **NEW - Funds Requested from Regional Office

MANAGEMENT, INTERPRETIVE, AND DEVELOPMENT NEEDS FOR ARCHEOLOGICAL STUDIES

This form specifies the actions necessary before or during the proposed project. Explanations are on the following pages

Project	Archeological Assessment	Field Inspection	E. O. 11593 Report	Se. 106 Report	Participation in planning, meetings, etc.	Test Excavation	Remarks
Fence Boundary 10-238 pkg #103 WACA RM-2		X					
* Exhibits and Wayside Signs 10-238 pkg #105	X						
* Storage Building 10-238 pkg #110	X						
Rehab Historic Structure 10-238 pkg #107 WACA H-1				X			
* Repair Sewage Lagoon 10-238 pkg #112	X	X					
* Entrance Station 10-238 pkg #101	X	X					
* Interpretive Replica Cliff dwelling 10-238 pkg #115	X				X		
* Master Plan 10-238 pkg #108							

* Not a part of the resources mangement plan.

PROCEDURES FOR ASSESSMENT OF CULTURAL RESOURCES AFFECTED BY DEVELOPMENT PROJECTS

Cultural resource preservation requires professional assessment of the effects of development projects which have been proposed in the Master Plan, Development Concept Plan, and programming documents. Kinds of assessment required are defined below, and these are listed for each project in Table 1:

Assessment: This consists of a review of a proposed development project to determine if it will affect cultural resources. It will determine if field inspection is required to determine effects, what is required to mitigate impact on the resources, and what steps are necessary to comply with legislation and policies on historic preservation. Assessment will be made with the concurrence of the Regional Office, according to current guidelines for environmental assessment.

Field Inspection and Report: If the project has the potential for disturbance of new ground, and if it is not documented by a report of previous field inspection, an on-site inspection or intensive survey by a professional archeologist should be provided for. If inspection shows that no cultural remains will be affected, a report by the archeologist can be used to document a determination of no effect, stated on an archeological clearance by the Regional Archeologist. Projects that may require inspection are: fence construction, utility lines burial, water-sewer system burial, building construction. In areas that are known to have cultural resources on or below the surface, it may be necessary to perform professional test excavations to insure that no cultural resources will be disturbed by a proposed project.

Executive Order 11593 Report: If the proposed action may result in the transfer, sale, demolition, or substantial alternation (adverse effect) of a potential National Register property, or land under the control or jurisdiction of the National Park Service, the expected effects must be reported following the latest procedures of the Advisory Council on Historic Preservation. Determination of effects will require professional assessment and/or field inspection.

Section 106 Report: If a project will affect a National Register property, steps must be taken to comply with Section 106 of the Historic Preservation Act as described in the latest procedures published in the Federal Register by the Advisory Council on Historic Preservation. Determination of effects will require professional assessment and/or field inspection.

Participation in planning, meetings, etc.: This activity involves having archeological consultation in master planning, development planning, interpretive planning, etc., to insure that such plans do not present any adverse impacts to cultural resources.

This professional participation can also be applied to reviews of other indirectly related projects, such as flora/fauna studies, water resource studies, etc.